

# MONTHLY WEATHER REVIEW

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## VOLCANIC ASH OVER THE CARIBBEAN, JUNE 1951

WILLIAM F. BROWN

Weather Bureau Airport Station, Miami, Fla.

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In the latter half of June 1951 an extensive haze layer moved over the Caribbean Sea and spread northward to the central and eastern United States. Density of the haze was such that horizontal visibility was less than a mile in some places; haze was reported to 14,000 feet elevation, and aircraft crews were often forced to resort to instrument flight over much of the Caribbean area. The condition clearly was not the usual haze frequently found beneath the trade-inversion of the tropics.

Examination of synoptic reports from Dakar, Africa, for the week preceding arrival of the haze over the Antilles revealed no indication of a dust storm or other possible cause of the unusual phenomenon. It was thus necessary to look further for the source of the haze. News reports of a volcanic eruption in the Cape Verde Islands were recalled and it developed that this was almost certainly the true origin of the haze.

The British Meteorological Office at Trinidad, B. W. I., furnished the information that on the morning of June 12, 1951, a volcanic eruption occurred on Fogo Island, in the Cape Verde group. The activity began with an explosion and earthquake; a cloud column from the craters built to a height of 25,000 feet; and ashes were observed falling on Fogo and nearby Bravo Island. By June 17 activity was decreasing but there were still active craters with flames and associated clouds. A secondary peak of activity was noted on June 26, the volcanic cloud ascending to 12,000 feet this time, after which the volcano gradually subsided.

Figure 1 reproduces the complete set of detailed charts used in calculating the movement of the haze from June 15 to 26. Figure 2 is a summary chart showing the spread of the haze. During the first 5 days the haze condition was tracked mostly by aircraft reports as the area it then covered has few land reporting stations. After the haze reached the southern Gulf States and Florida on June 20, land reports of course were available; the 1830 GMT reports were used in tracking the movement, for at this

time any local restriction to visibility would tend to be dispersed.

Several interesting features of the spread of the haze are revealed by figures 1 and 2. Unusual haziness was reported in the Barbados-St. Lucia-St. Vincents area of the Lesser Antilles beginning on June 15 and examination of wind flow charts for the Cape Verde to Antilles portion of the Atlantic indicates that its source could very well have been the Fogo eruption. The distance is 2,300 miles and elapsed time between the eruption and initial appearance of the haze in the Windward Islands is consistent with the indicated average wind speed of about 25 knots.

From the Windward Islands the haze-bearing stream moved west-northwestward at a speed of about 28 knots,

### EXPLANATION OF SYMBOLS USED IN FIGURE 1

#### In-flight and post-flight reports:

Aircraft or route identification (for example, PAA 508 or MIQ/KIN)

Flight altitude (FA) in hundreds of feet.

Time of flight, GMT (Z)

Conditions of flight, IFR (instrument), VFR (visual)

Clouds observed

Type—standard cloud abbreviations (U. S. Weather Bureau, Circular S).

Amount—in eighths of sky cover or U. S. Weather Bureau sky cover symbol (U. S. Weather Bureau Circular N, 6th ed. revised) (example: 2 Cu=2/8 cumulus and 2/5 Cu=2/8 to 5/8 cumulus).

Height—in hundreds of feet top/base (XX=unknown).

Visibility, horizontal—in miles

Wind at flight altitude (or given altitude)—direction (degrees)/speed (knots).

#### Land station reports:

Visibility, horizontal—statute miles coded in eighths of miles up to 10 mi. (80=10–12 mi., 81=13–24 mi., 82=25–39 mi.) (U. S. Weather Bureau Synoptic Code, effective January 1, 1949).

∞—dry haze present.

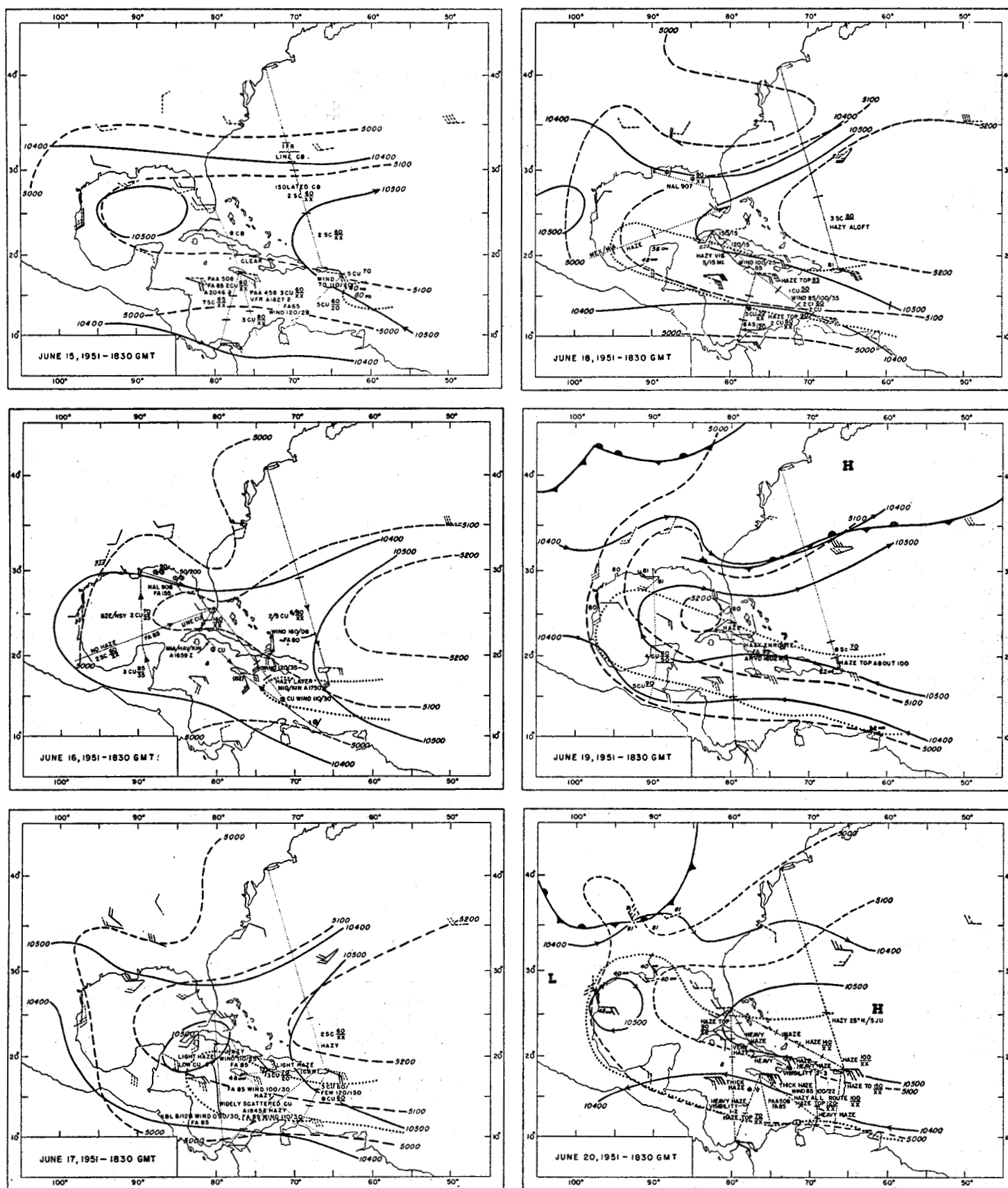
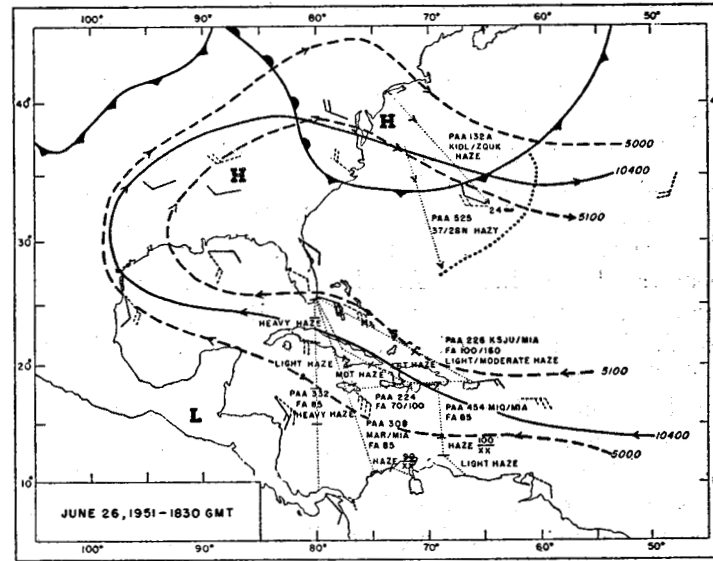
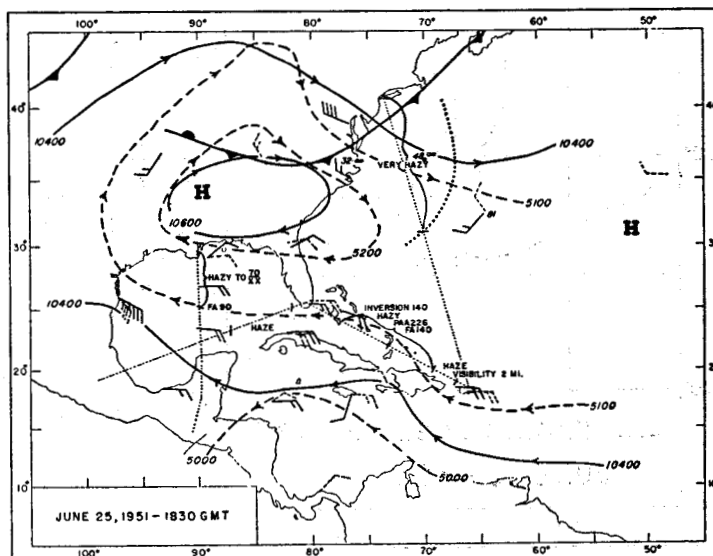
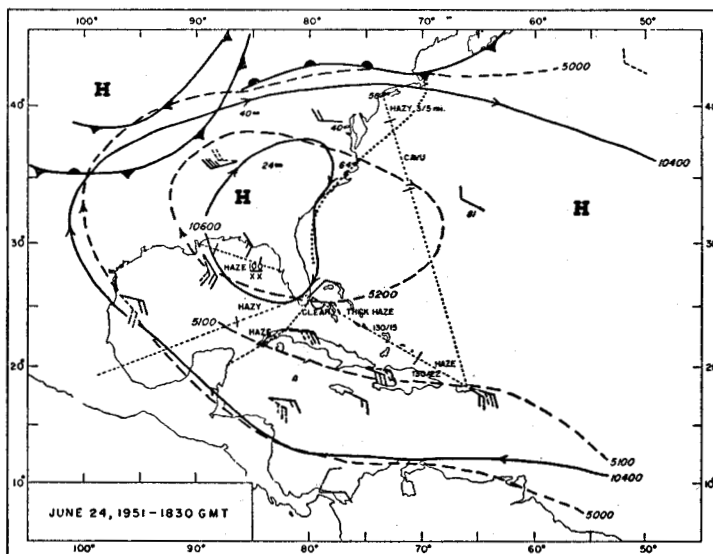


FIGURE 1.—Daily charts showing leading edge of haze layer (heavy dotted line) as determined by aircraft and weather station reports, June 15-26, 1951. Solid lines are the 700-mb. 5 knots). Thin dotted lines are flight paths.



Contours labelled in feet, dashed lines are the 850-mb. contours. Solid wind symbols are 10,000-ft. winds, dashed symbols are 5,000-ft. winds (full barb=10 knots, half barb=5 knots). See page 59 for explanation of plotted reports.

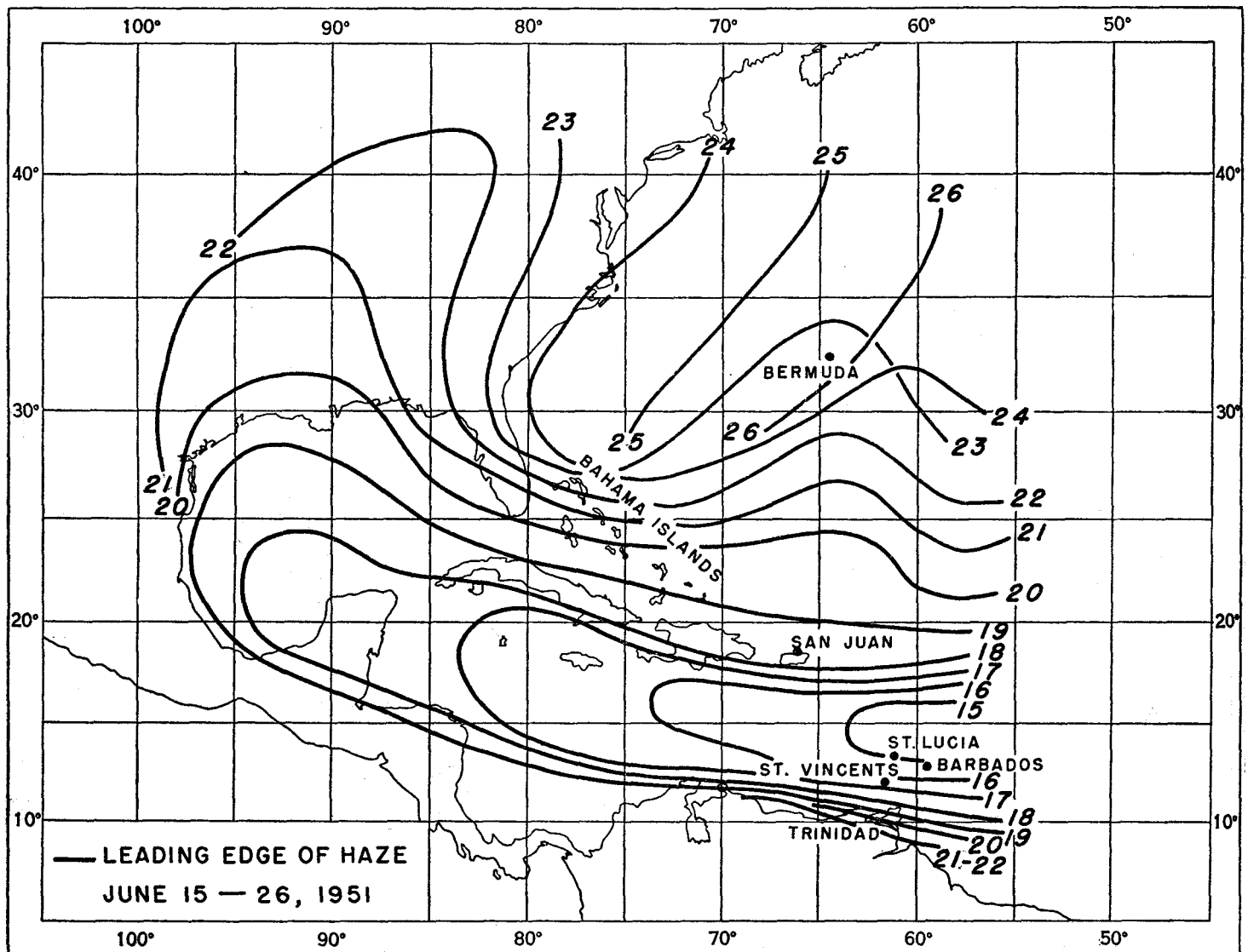


FIGURE 2.—Spread of haze layer, June 15-26, 1951. Each line shows the leading edge of the haze on the date indicated. The complete set of detailed charts used in calculating the movement of the haze is reproduced in figure 1.

reaching the Gulf of Campeche on June 18, and the Gulf Coast of the United States about 2 days later.

It is interesting to note from a comparison of the charts for June 15 and 18 that in the time required for the haze to travel 2,000 miles downstream its lateral spread within the stream was only about 200 miles. After the haze had penetrated the Lesser Antilles in a relatively narrow stream, about 3 days elapsed before it spread southward to Trinidad and northward to San Juan. Horizontal visibility was reduced to two miles at San Juan and to one-half mile at Trinidad on June 19. Haze was reported in the eastern Bahamas beginning on the 20th, apparently the result of an eddy turning northward from the main stream, and on the 23d arrived at Bermuda in a southwesterly wind. The hazy condition at Bermuda was short-lived in this instance, moving out on June 24 as the wind veered to northwest.

Under the influence of circulation systems existing at the time, the forward edge of the main stream of haze spread northward from the Gulf of Mexico through the

central valleys to northern Ohio by June 23, then turned eastward and passed off the middle Atlantic coast ahead of an advancing cold front. Two days later haze reappeared at Bermuda, with visibility only about 3 miles throughout the afternoon of June 26. This was undoubtedly the main body of haze-laden air.

Upon reaching Bermuda the haze travelled about 7,000 miles from its volcanic origin on Fogo Island, and, considering its density at Bermuda, probably could be traced much farther.

To further investigate the character of the haze particles, cooperation of Dr. Virgil G. Sleight, of the University of Miami geology department, was solicited. Haze samples were obtained, one by Dr. Sleight at the University, another from the windshield of Pan American World Airways flight 226, flying between San Juan and Miami on June 22. Microscopic examination of the samples indicated that they were similar and both of the nature of volcanic ash.